Fig. 1

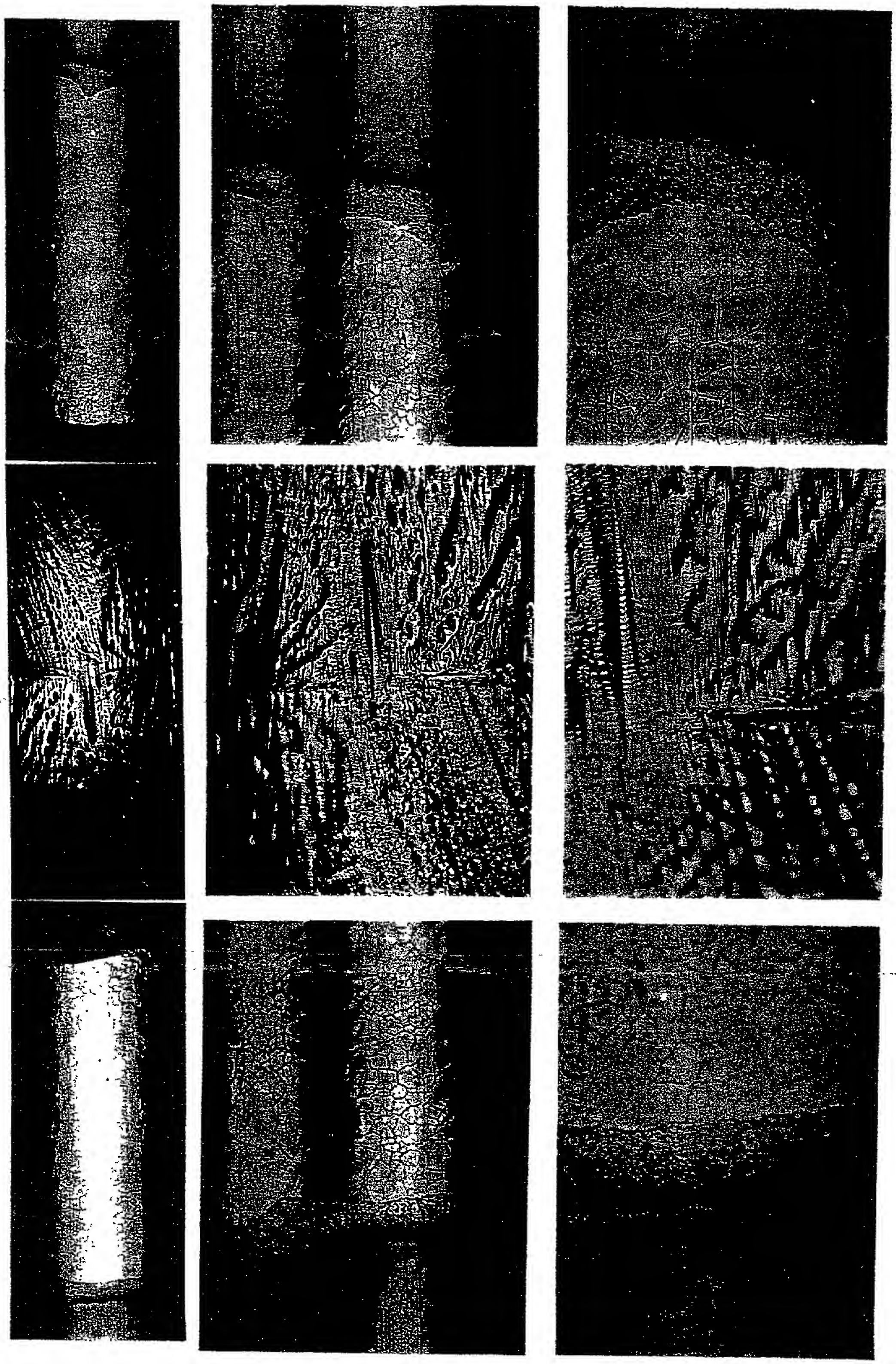
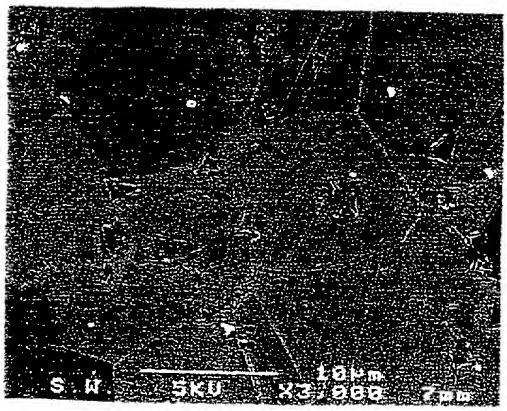
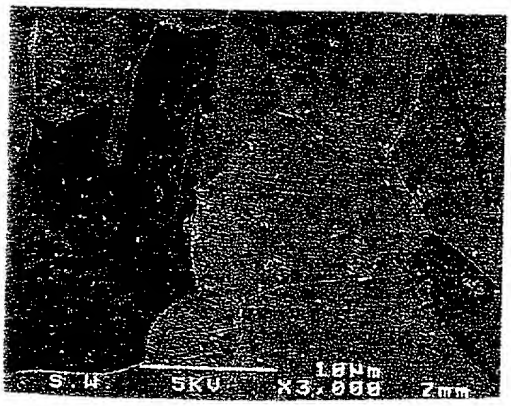

DOWNSTREAM
HEAT - AFFECTED PART
WELDED PART
UPSTREAM
HEAT - AFFECTED PART
×50
×100
×200

Fig. 2

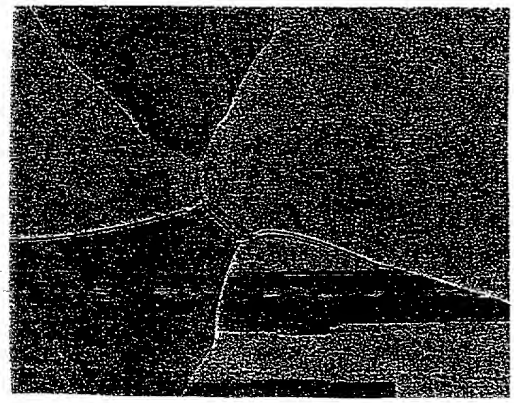
DOWNSTREAM



5mm

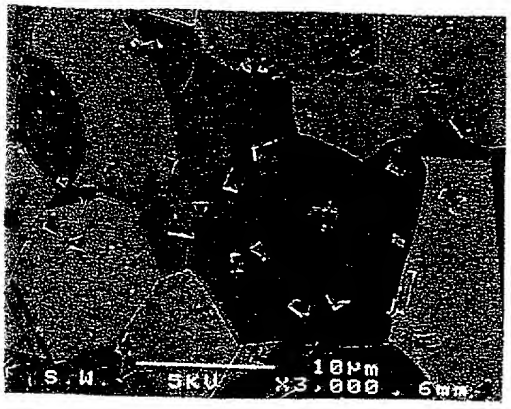


3mm



3mm

WELDED PART



5mm

UPSTREAM

[BACK SHIELD GAS : 100 % Ar]

PARTICLE MEASUREMENTS AT WELDED PARTS

AT WELDING COMDITIONS (30rpm × 1rev. BEAD WIDTH 1mm) 9 WELDED SPOTS

FLOW RATE: 0.1cf/min (U − N_2) , PARTICLE MEASUREMENT : 0.1 μm OR LARGER

BASE METAL	STAINLESS STEEL TUBU SUBJECTED TO FLUORIED PASSIVATION TREATMENT					REGULAR STAINLESS STEEL
	NO WELDING	CONVENTIONAL WELDING METHOD	WELDING AFTER FILM REMOVAL WITH HOT WATER (80℃)	WELDING AFTER FILM REMOVAL WITH 0.5%HF/ 10%H_2O_2	WELDING METHOD WITH 5% ADDED H_2	CONVENTIONAL WELDING METHOD
NO HAMMERING (10min)	0	0	0	0	0	0
WITH HAMMERING (10min)	0	60	0	0	0	0

Fig. 4

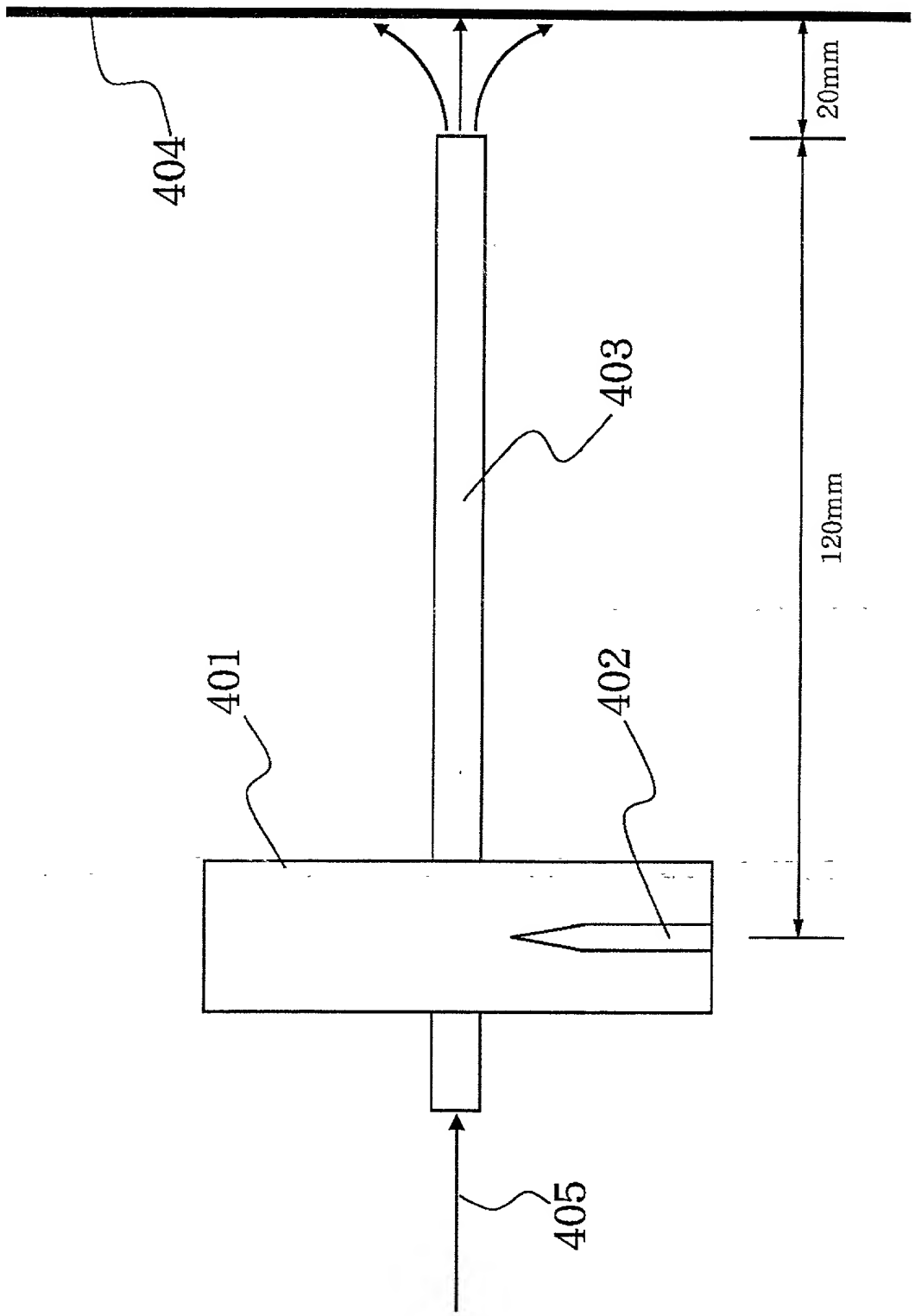
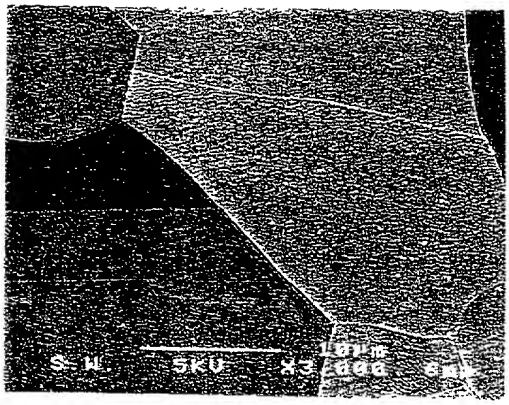


Fig. 5

DOWNSTREAM

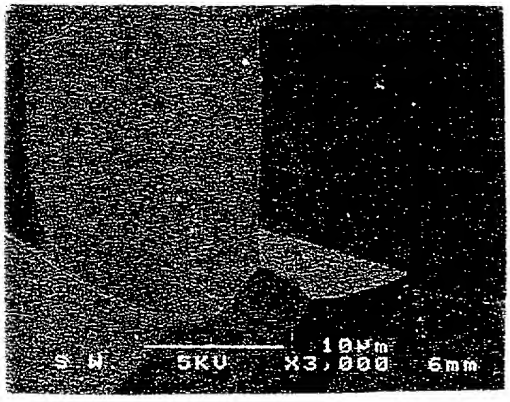
5mm

3mm



3mm

WELDED PART



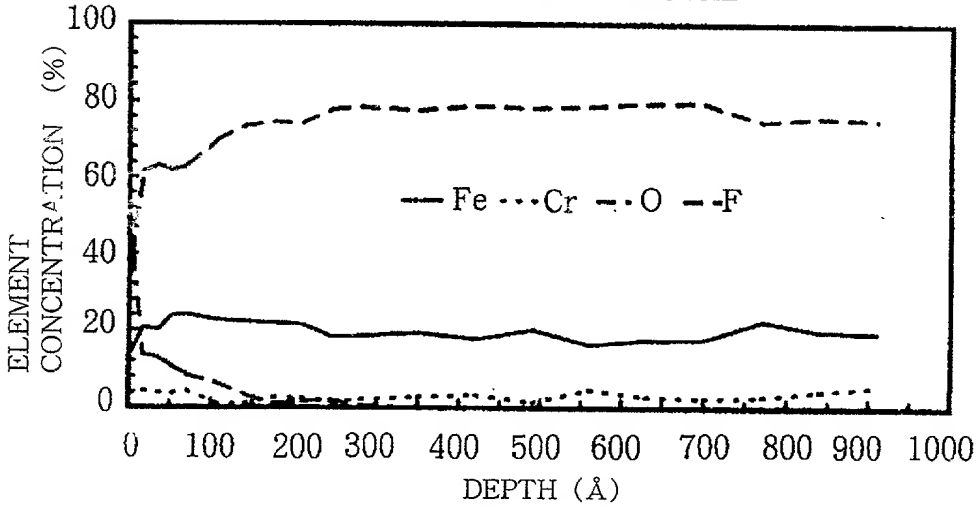
5mm UPSTREAM

[BACK SHIELD GAS : 5 % H_2/Ar]

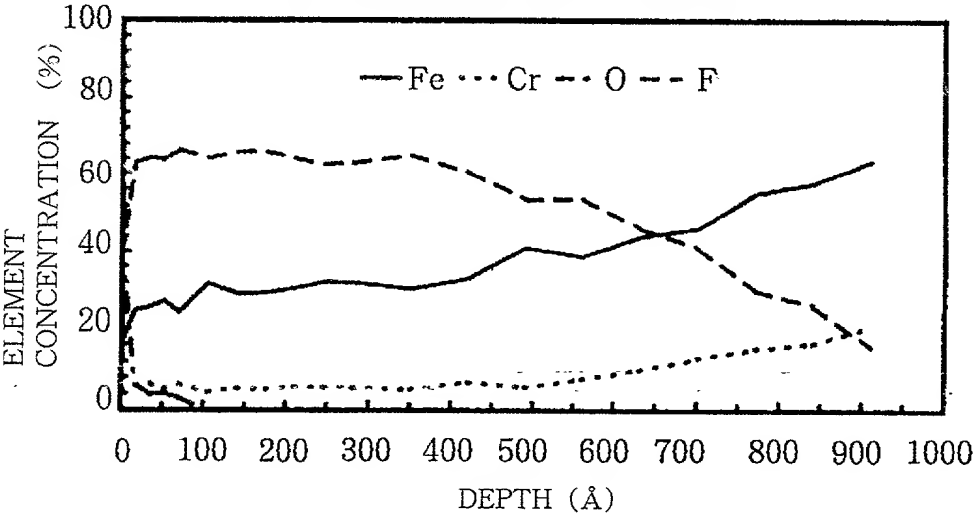
Fig. 6

REMOVAL OF FLUORIDE PASSIVATED FILM USING HOT WATER (80℃)

(a) PRIOR TO FILM REMOVAL



(b) IMMERSION FOR 1 MINUTE



(c) AFTER IMMERSION FOR 3 MINUTES

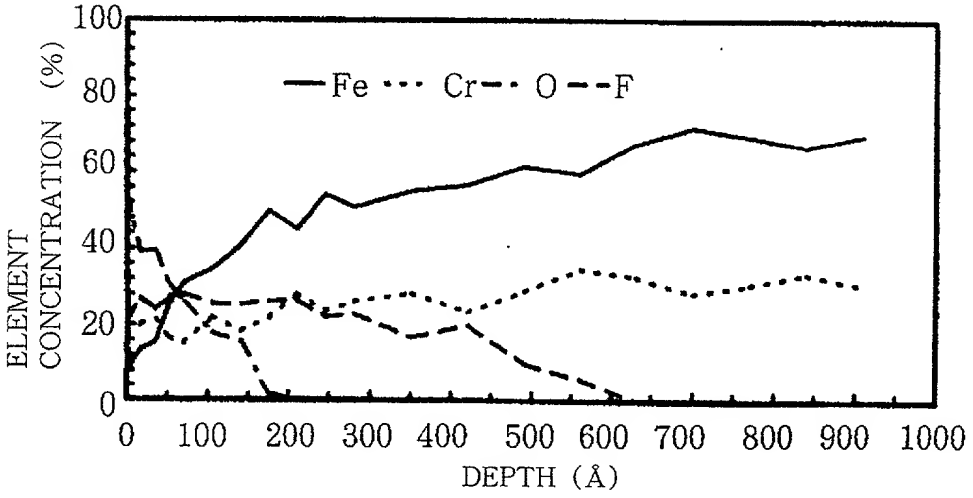
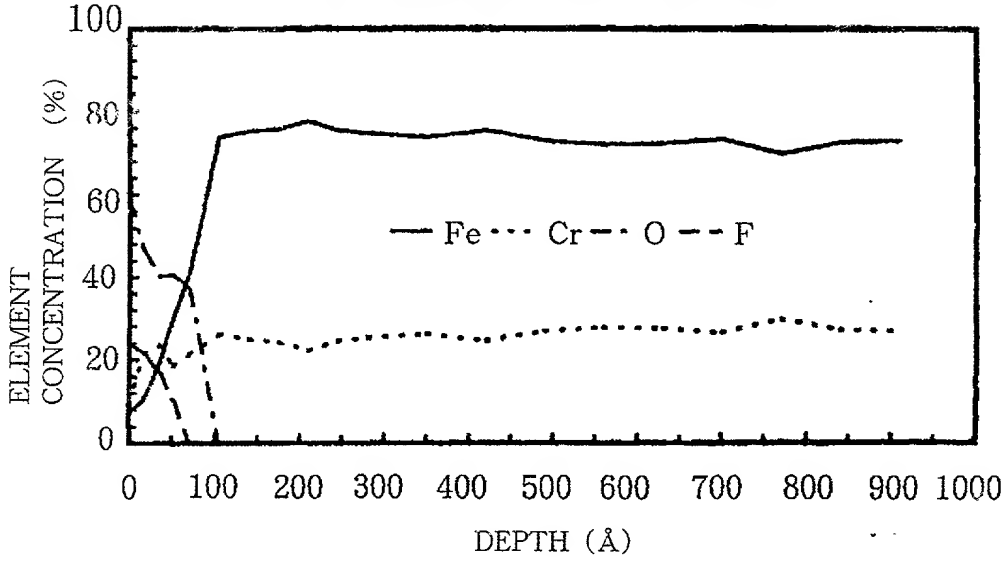


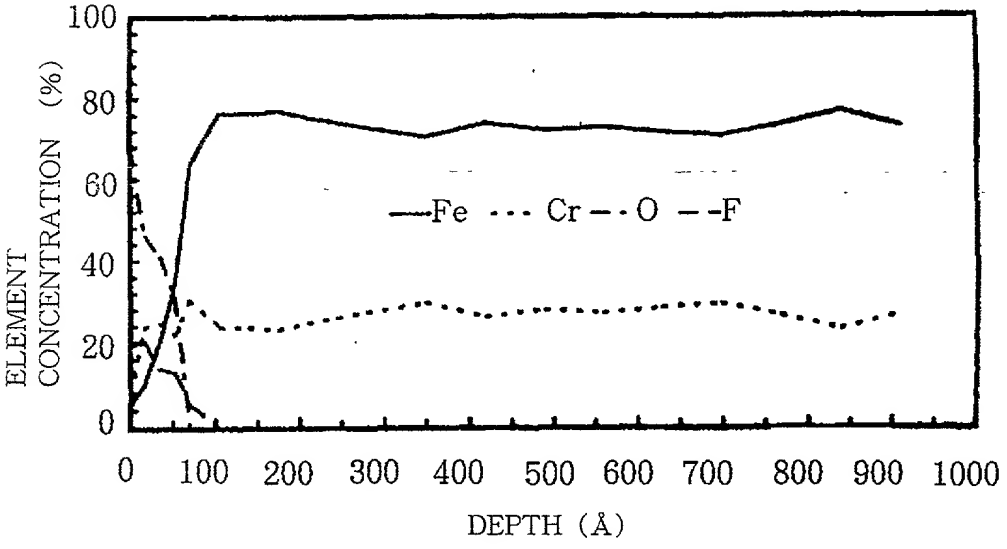
Fig. 7

REMOVAL OF FLUORIDE PASSIVATED FILM USING HOT WATER (80℃)

(a) IMMERSION FOR 5 MINUTES



(b) IMMERSION FOR 10 MINUTES



(IMMERION FOR MINUTES IN
80℃ ULTRAPURE WATER)

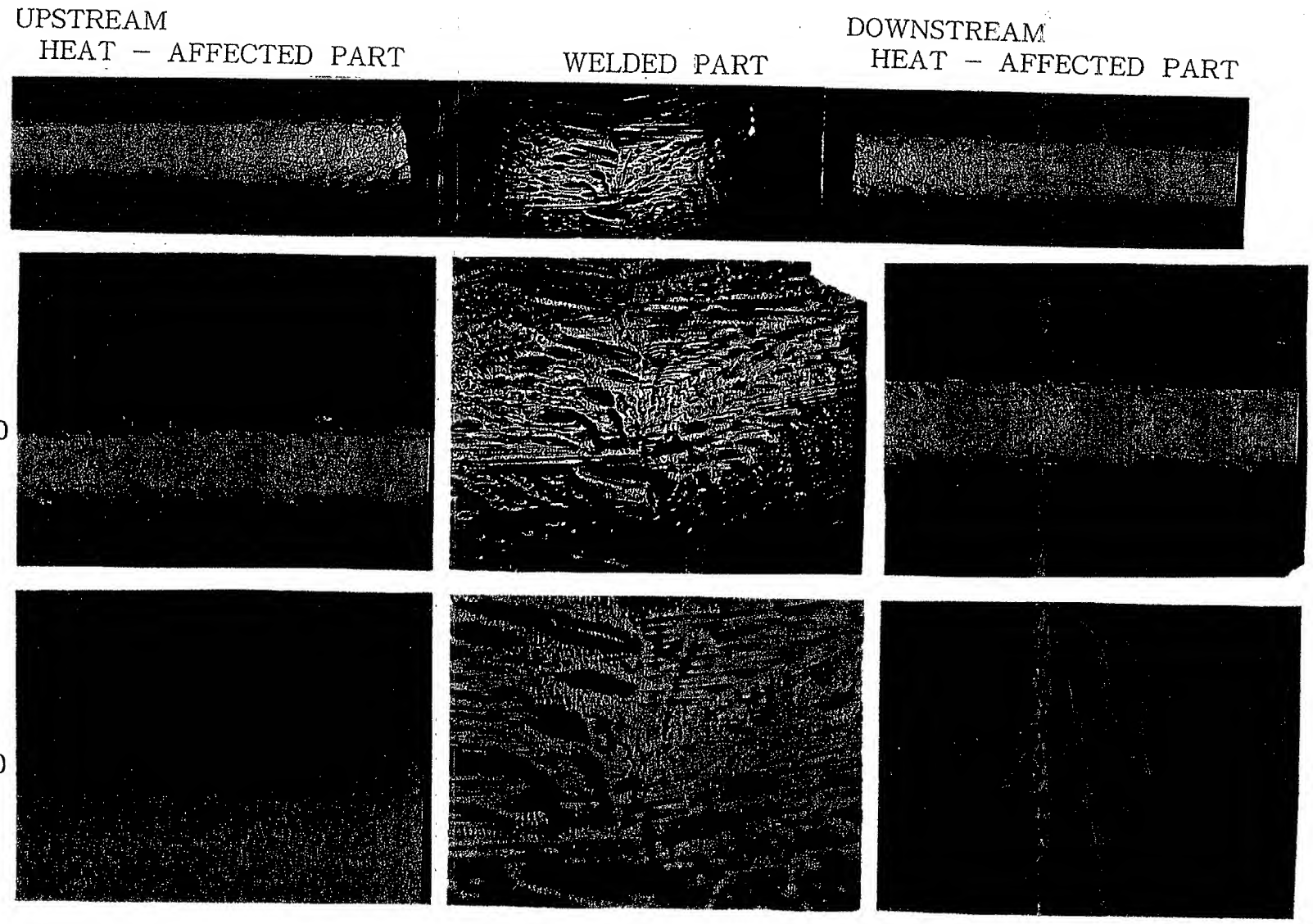
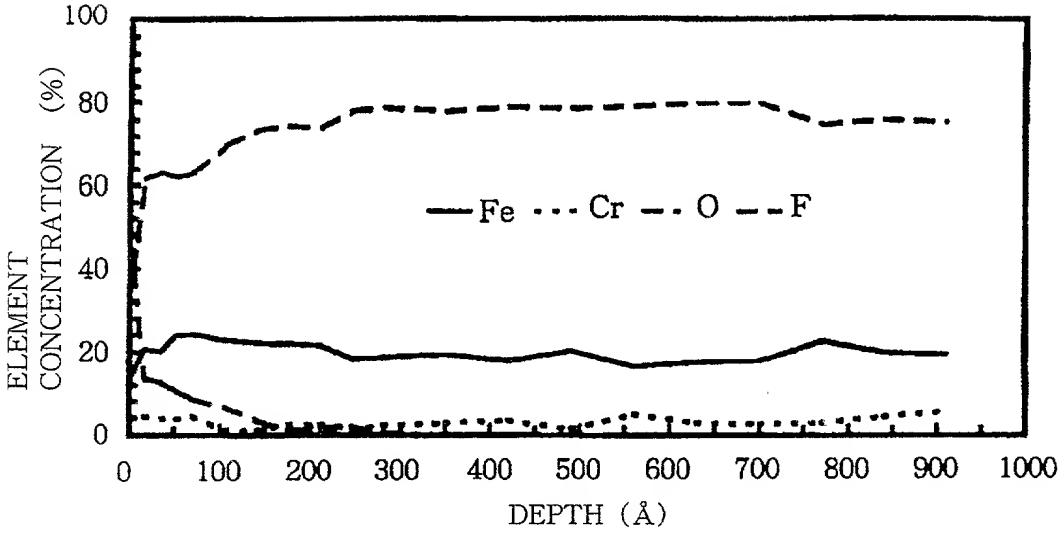


Fig. 8

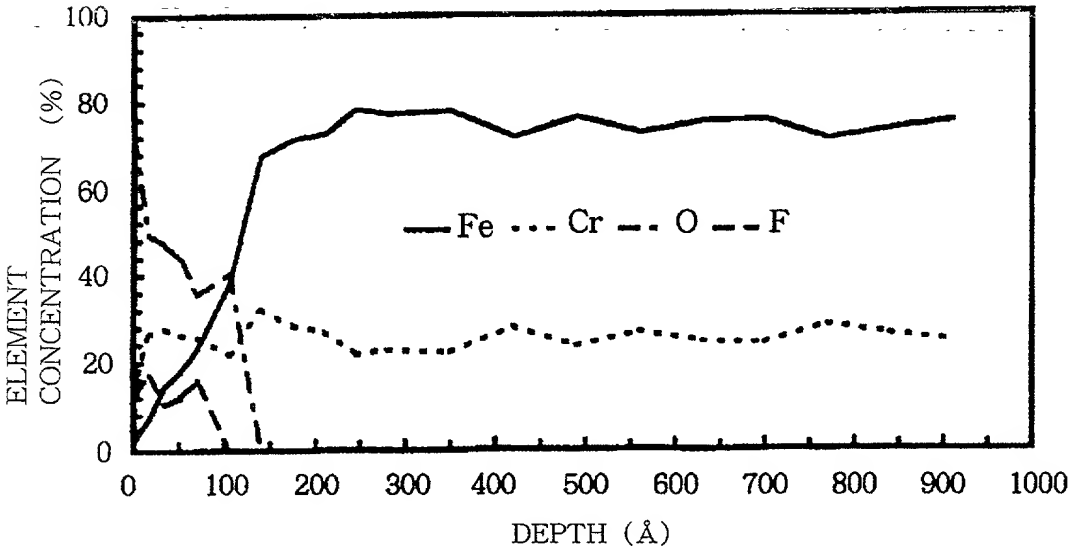
Fig. 9

REMOVAL OF PASSIVATED FILM USIMG A MIXED AQUEOUS SOLUTION OF 0.5% HYDROFLUORIC ACID AND 10% HYDROGEN PEROXIDE

(b) PRIOR TO FILM REMOVAL



(b) IMMERSION FOR 10 MINUTES



(IMMERION FOR 10 MINUTES IN
A MIXED AQUEOUS SOLUTION
OF 0.5% HYDROFLUORIC ACID
AND 10% HYDRGEN PEROXIDE)

UPSTREAM HEAT - AFFECTED PART | WELDED PART | DOWNSTREAM HEAT - AFFECTED PART

× 50

× 100

× 200

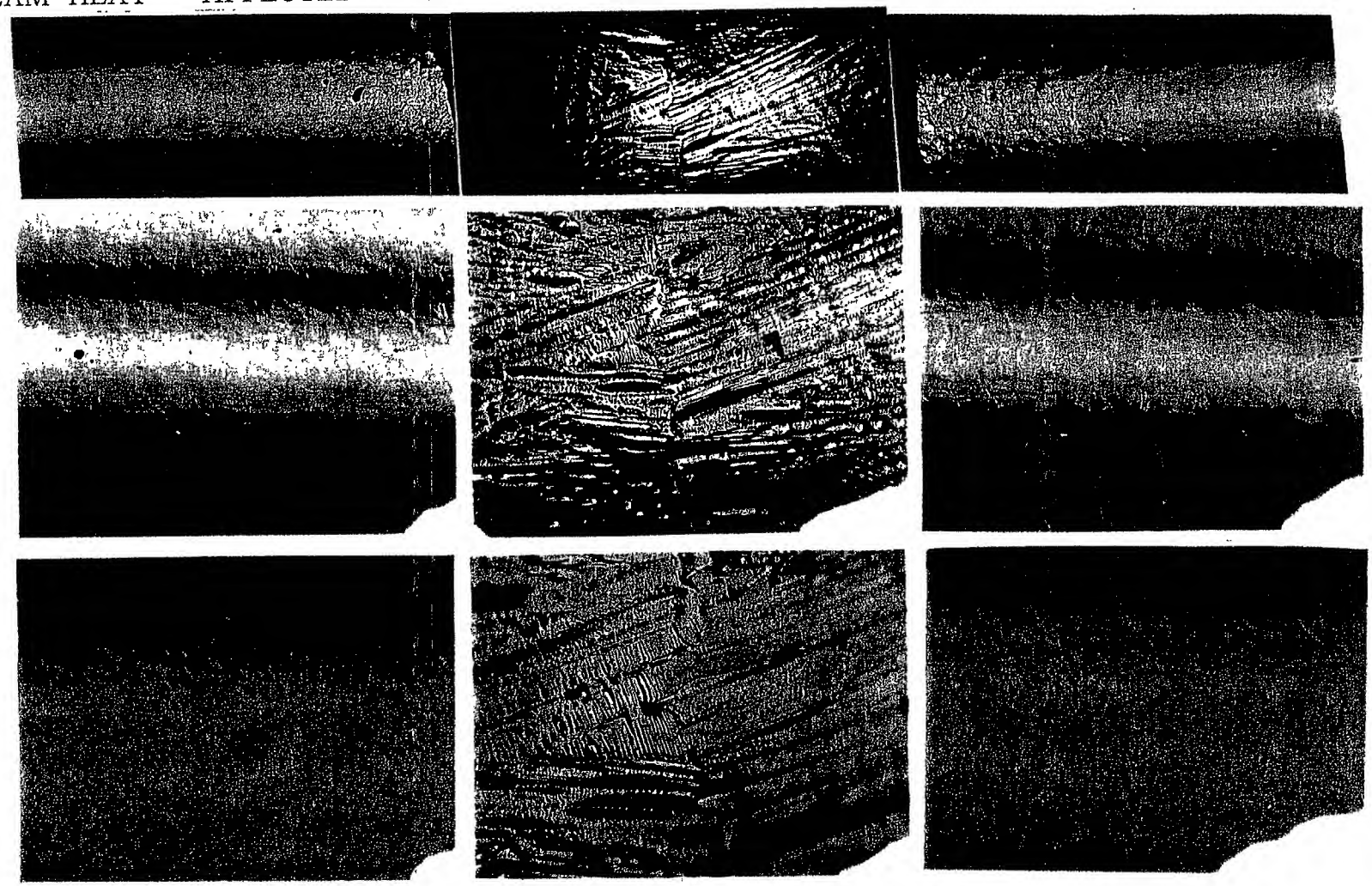


Fig. 10

Fig. 11

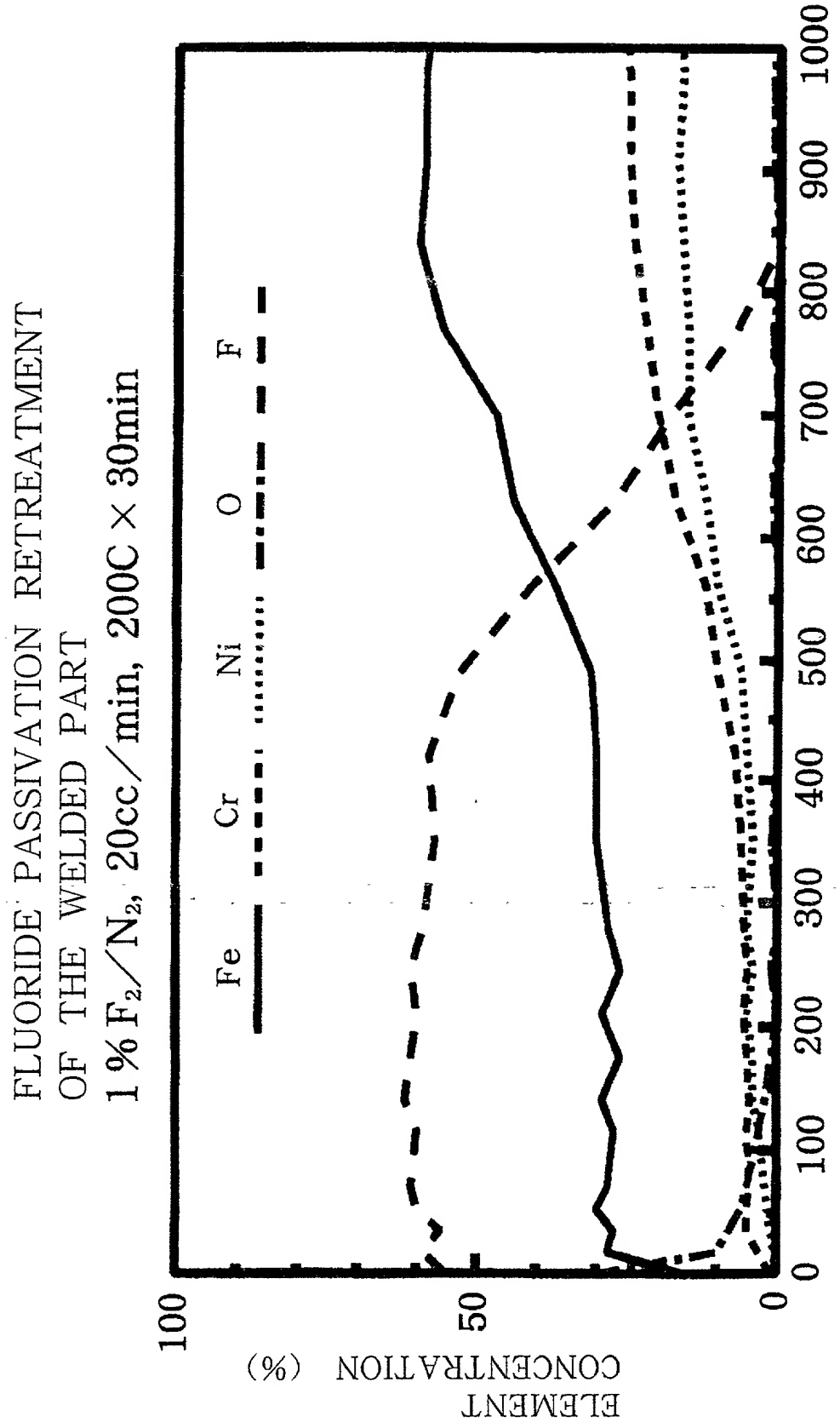
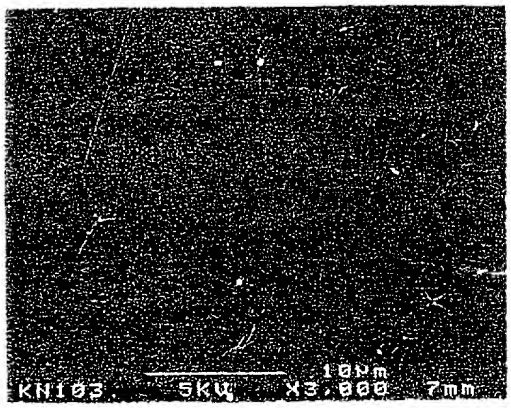
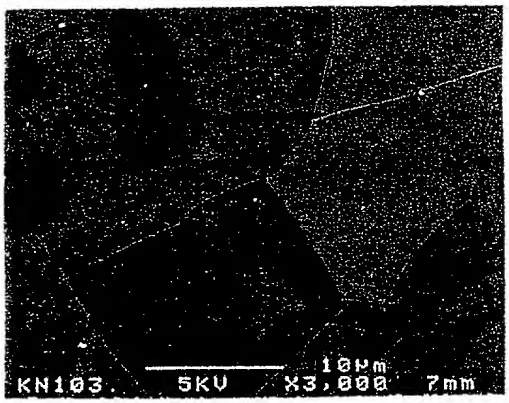

FLUORIDE PASSIVATION RETREATMENT
OF THE WELDED PART
1% F_2/N_2, 20cc/min, 200C × 30min
Fe
Cr
Ni
O
F
ELEMENT CONCENTRATION (%)
100
50
0
0
100
200
300
400
500
600
700
800
900
1000
DEPTH (Å)

Fig. 12

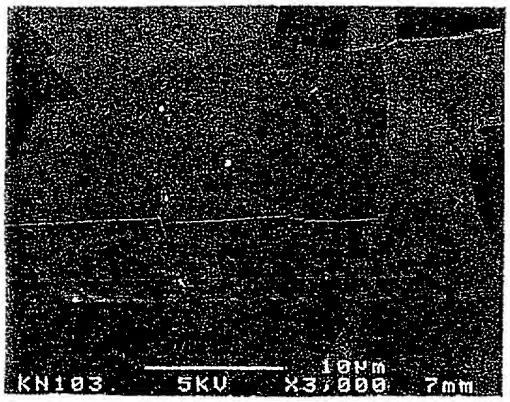
DOWNSTREAM



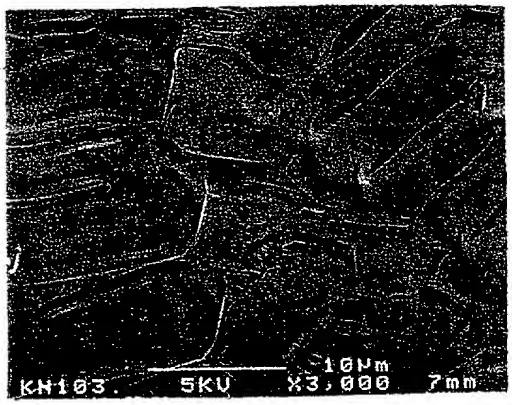
5mm



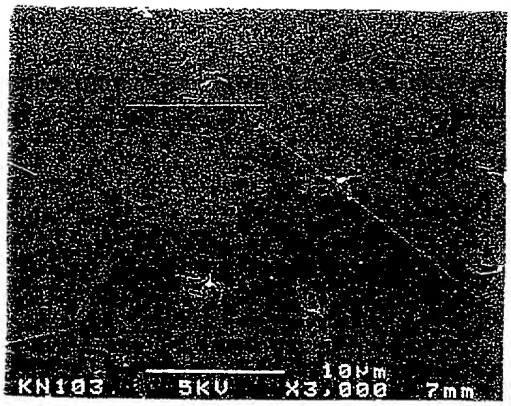
3mm



3mm



WELDED PART



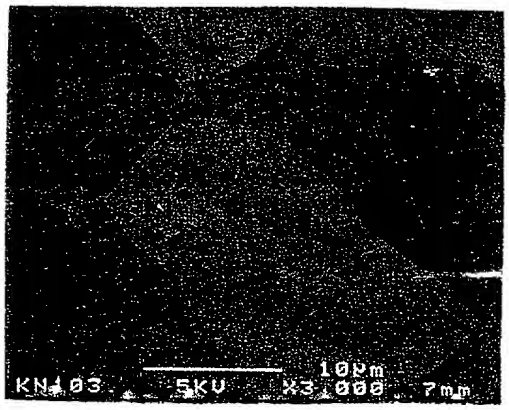
5mm

UPSTREAM

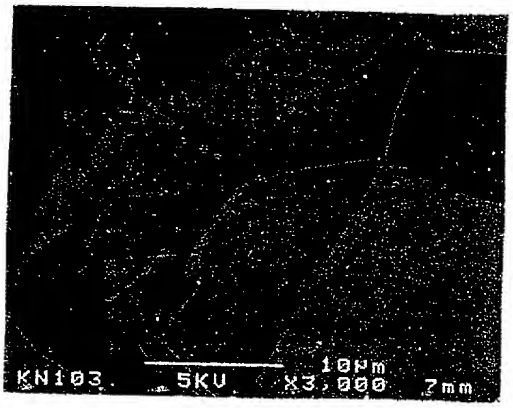
[BACK SHIELD GAS : 0.1 % H_2/Ar]

Fig. 13

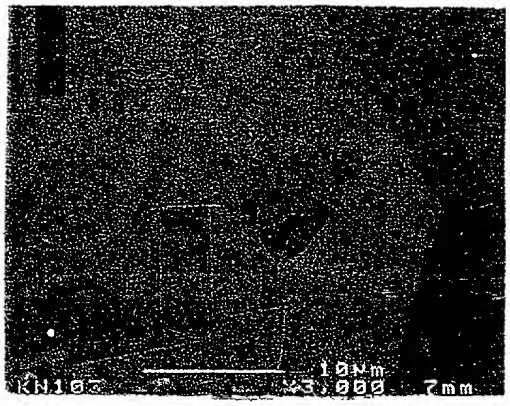
DOWNSTREAM



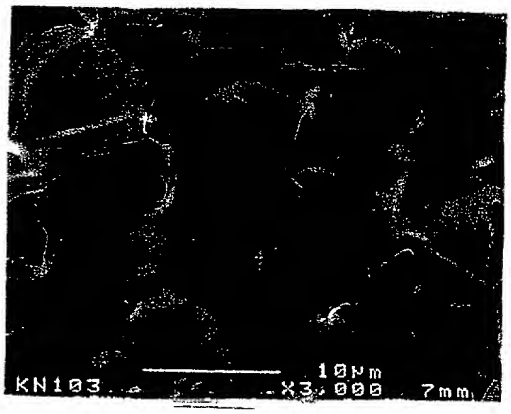
5mm



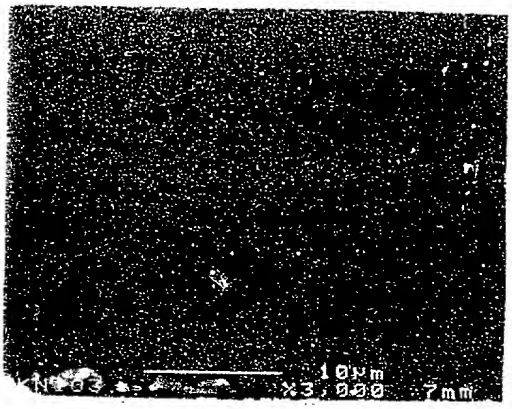
3mm



3mm



WELDED PART



5mm

UPSTREAM

[BACK SHIELD GAS : 0.5 % H_2/Ar]